
GAME REPORT

Antelope Management Surveys, 2003

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**Annual Report
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ANTELOPE MANAGEMENT SURVEYS, 2003

Annual Report

by
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ABSTRACT

ANTELOPE MANAGEMENT SURVEYS, 2002

The annual aerial spring inventory of antelope was conducted from April through June, 2003. From these survey data, the July population of antelope in South Dakota was estimated to be 40,788 and the average doe:fawn ratio was 100:85.

The 2003 antelope rifle season was held from October 4-12. A total of 5,340 resident and 419 nonresident licenses were issued. The projected kill was 5,948 antelope for a 70% success rate. Of the total antelope killed, 62% were bucks and 38% were does.

Archery antelope season was held from August 16 through October 31, 2003. Unit 700A-20 had 842 resident and 212 nonresident licenses issued. Projected kill was 258 antelope for a success rate of 24%. Unit 702B-20 had a total of 10 resident licenses issued, hunter report card returns indicated that 3 buck antelope were harvested for a 30% success rate. Unit 714B-20 had a total of 14 resident licenses issued, hunter report card returns indicated that one buck antelope was harvested.

PREFACE

Presented in this report are data gathered during the 2002-2003 fiscal period under Pittman-Robertson Project W-95-R-37 for Study Number 9508, titled Antelope Management Surveys. Jobs included are:

Job 9508-1 Spring Inventory of Antelope

Job 9508-2 Analyses of Antelope Hunter Report Card Data

Previous reports in this study include a study report from 1973 to present, and separate job reports prior to 1973. Data from this report can be referenced with permission from the author or Secretary of the South Dakota Department of Game, Fish and Parks. Copies of the report are available from the Department of Game, Fish and Parks, Foss Building, 523 East Capitol Avenue, Pierre, South Dakota, 57501.

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ANTELOPE MANAGEMENT SURVEYS, 2002

INTRODUCTION

It is estimated that prior to 1800 over 700,000 antelope roamed the prairies of South Dakota. By 1909 antelope were considered extinct east of the Missouri River. In 1924, it was estimated there were 680 antelope in western South Dakota. Through proper game management, antelope numbers had begun to increase by 1937. In 1941, the first aerial counts were conducted, and the population was estimated at 10,000 antelope. Through aerial censusing, the summer antelope population was estimated to be over 67,000 animals in 1983 (Appendix Table 1).

Annual aerial census allows determination of population status, trend, distribution and productivity. Regulated hunter harvest is the most important tool for management of antelope in South Dakota. Ultimate objectives of antelope management are to keep the population well distributed, within landowner tolerance levels and range carrying capacity, and to provide optimum recreational opportunity. Hunting units are established on a flexible unit and permit quota system. The permit quota system enables managers to increase, stabilize or reduce the populations independently of each other and has been effective in South Dakota since 1941. Hunter questionnaire surveys and archery hunter report cards provide harvest information.

STUDY OBJECTIVES

The objectives of this study are to annually determine status, distribution and harvest characteristics of antelope in South Dakota, and to evaluate the effects of antelope management (harvest) practices.

JOB 9508-1 SPRING INVENTORY OF ANTELOPE

Objectives

To annually determine adult sex ratio, annual reproduction, and total population of antelope, within each county or management unit in the antelope range.

Procedures

All counties or portions of counties which were thought to have one or more antelope per two square miles were censused. Those counties or portions of counties which were known to have a density of less than one antelope per two square miles are censused every third year, or sooner based upon a determination by local management personnel. Specific instructions sent to the observers (Conservation Officers) are included as Appendix Table 2.

County areas were blocked into approximately 400 square mile working units delineated by recognizable boundaries. Census area in a work unit consisted of a one-third sample. Transects were a one-half mile wide belt, one-quarter mile on either side of the aircraft, and were oriented in a north-south direction. County road maps were used as aids in locating transects, and antelope

observations were recorded on the map. A unit census summary sheet was prepared for each unit censused. All antelope within the transect were identified by sex and age if possible. If positive identification could not be made, observations were recorded as "unidentified".

Flights to determine doe/fawn ratios were discontinued in 1986 due to a low benefit:cost ratio. Random ground count surveys conducted from June 20-September 30 in each management unit were substituted for the aerial surveys to determine estimates of fawn production. Recommended sample size was 10% of the does in high density units and 50% of the does in low density units. Data collected by the observers were then mailed to the job leader for analysis and comparison with historical doe/fawn ratio information. Current data on populations and doe/fawn ratios was compared to previous years data, and management recommendations to reach season goals were formulated.

Findings

The aerial survey this year began in early May and was finished by late June. The calculated July 2002, antelope population for South Dakota was 40,788 (Appendix Table 3), a decrease of 39% from 2002 (Appendix Table 1). The average doe:fawn ratio was 100:85, a 2% increase from 2002 figures of 100:83.

Recommendations

1. Due to variability of surveys on a unit basis from year to year and man-hours need to conduct the present survey methodology, research into a new survey should be conducted.
2. There should be a training session on antelope aerial census techniques for all personnel involved.
3. County maps with boundaries should be used by all observers.
4. Survey data should be summarized by year; and an evaluation made concerning the trend, adequacy of sample size and frequency units should be sampled for future management.
5. Populations in all units and potential units should be determined. Ground observations should be used to estimate populations in eastern counties and new units.
6. Doe/fawn ground counts should be used to determine doe:fawn ratios.
7. A 10-year trend analysis of the spring aerial census data should be distributed to all management personnel to encourage greater familiarization of species response to past management practices.

JOB 9508-2 ANALYSIS OF ANTELOPE HUNTER REPORT CARD DATA

Objectives

To annually determine composition of antelope harvest, man-days of recreation provided and other hunter information as necessary for evaluating the antelope hunting season.

Procedures

In 1988, a subsampling hunter questionnaire survey was implemented for the firearm season and in 2000 for the archery season. A random sample of hunters from each season and all units were contacted by mail at the end of the antelope hunting season. Two follow-up mailings were used in order to maximize response and minimize the effect of nonreporters on projected harvest statistics. A minimum acceptability response level has been established as 85% providing harvest estimates within +/- 15% accuracy of the sample statistic. Projections were made solely from reported data. No correction factors are employed. Confidence in projections is (+/-) 10% given that the unit/subunit sampling size is greater than or equal to 50. Collected information may vary annually.

Findings

Licenses available for the 2003 firearm season included 5,535 (8,415 tags) resident licenses and 458 (692 tags) licenses were available to nonresidents (Appendix Tables 1,4 and 5). The total number of licenses available increased 19% from the number of licenses available in 2002, while the total number of tags increased 35%.

The season was held from October 4 through October 12 in firearm units shown in Appendix Figure 1. Total license sales were 5,340 (7,862 tags) resident licenses and 419 (643 tags) nonresident licenses. The hunter questionnaire survey showed a response rate of 91 % and that 5,948 antelope were harvested for a success rate 70% (Appendix Tables 4 and 5). Harvest composition was 62% bucks and 38% does.

The 2003 antelope archery season (Unit 700A-20) was open in the same area, both East and West River, that are open during the firearm antelope season (Appendix Figure 1). Season dates ran from August 16 through October 31 except when and where a firearm antelope season is open. Archery antelope licenses in this unit were unlimited and available to residents and non-residents. A total of 842 resident and 212 non-resident licenses were sold (Appendix Table 6). An 86% hunter report card return yielded a projected kill of 258 antelope and a projected success rate of 24%.

A new archery antelope unit was opened for the 2003 season. This unit (702B-20) incorporates a portion of the Black Hills where a small herd of antelope have become established. A total of 10 licenses were made available in this unit. Nonresidents could not start applying until the third drawing. Season dates ran from August 16 through October 31 except when and where a firearm antelope season is open. A total of 10 licenses were sold. A 100% hunter report card return yielded a projected harvest of 3 antelope and a projected success rate of 30%.

A total of 50 licenses were made available in Unit 714B-20. Nonresidents could not start applying until the third drawing. This unit includes Buffalo County and that portion of Brule County north of Interstate 90. Season dates ran from August 16 through October 31 except when and where a firearm antelope season is open. Fourteen of these licenses were sold. One hunter reported harvesting an antelope.

Recommendations

1. A 10-year trend analysis of hunter report card data should be distributed to all management personnel to encourage greater familiarization of species response to past harvest strategies.

APPENDIX

Appendix Table 1. Trend in antelope population, firearm license sales and hunter harvest, 1941 - 2003.

Year	Population in Area Censused	Number of Licenses Sold	Number of Antelope Killed
1941	10,000	500	480
1942			
1943	7,973	1,000	976
1944	5,370	500	480
1945	6,721	Closed	
1946	9,442	700	609
1947	14,800	2,000	1,875
1948	13,000	2,549	2,371
1949	7,425	Closed	
1950	10,920	850	759
1951	14,356	3,350	3,151
1952	16,608	8,350	7,880
1953	15,090	5,244	4,750
1954	16,756	5,700	5,196
1955	16,664	4,850	4,281
1956	19,374	6,266	5,616
1957	16,885	4,415	3,885
1958	16,235	3,300	2,900
1959	20,272	5,569	4,950
1960	23,330	6,708	6,037
1961	27,480	8,596	7,990
1962	26,382	6,991	6,152
1963	27,658	8,090	7,280
1964	24,566	7,470	6,050
1965	27,286	8,750	6,776
1966	20,954	4,965	4,244
1967	23,400	6,547	4,847
1968	22,142	3,229	2,419
1969	23,595	4,382	2,880
1970	25,100	4,850	3,807
1971	34,690	7,004	5,452
1972	34,894	7,225	6,370

Appendix Table 1. Continued.

Year	Population in Area Censused	Number of Licenses Sold	Number of Antelope Killed
1973	33,128	7,770	6,831
1974	41,358	10,114	8,542
1975	43,083	12,139	10,331
1976	33,505	8,340	6,722
1977	40,390	9,335	7,592
1978	28,425	5,849	4,714
1979	18,333	3,128	2,473
1980	25,402	5,236	4,408
1981	37,277	7,804	6,530
1982	53,934	13,899	11,145
1983	67,281	17,439 ³	14,697
1984	61,644	15,388	16,999
		(22,456 tags)	
1985	48,741	12,656	12,601
		(16,320 tans)	
1986	14,570	1,484	953
1987	15,753	1,690	1,271
1988	20,836	2,274	1,779
1989	34,943	4,433	3,702
1990	31,476	5,104	4,408
		(5,645 tans)	
1991	46,668	7,138	7,542
		(8,537 tans)	
1992	49,010	8,391	8,796
		(11,212 tans)	
1993	49,270	9,506	9,367
		(13,872 tags)	
1994	43,205	7,568	7,254
		(11,1537 tags)	
1995	53,765	8,721	8,752
		(12,707 tans)	
1996	36,266	6,472	5,501
		(7,726 tags)	

Appendix Table 1. Continued.

Year	Population in Area Censused	Number of Licenses Sold	Number of Antelope Killed
1997	20,518	2,901 (2,901 tags)	1,984
1998	19,897	2,749 (2,749 tags)	1,828
1999	29,695	3,651 (3,752 tags)	2,627
2000	33,322	4,165 (4,705 tags)	3,376
2001	33,420	4,965 (6,634 tags)	4,656
2002	29,258	4,813 (6,495 tags)	4,444
2003	40,788	5,759 (8,505 tags)	5,948

^a Includes 4,000 bonus doe/fawn tags.

Appendix Table 2. Instructions for inventory of antelope in South Dakota.

For Collecting The Data:

1. All counties or portions of counties likely to have an antelope season and which are thought to have one or more antelope per two square miles shall be censused annually. Those portions of counties which are considered to have less than one antelope per two square miles will be censused every second year.
2. The census shall start about mid-May in all counties, except Fall River County, which will start in late June. The census shall terminate by July 1 for data compilation.
3. At least three planes shall be used of not less than 115 HP; maximum cruising speed not to exceed 75 mph; windshield and windows to be clean and free from scratches and blemishes which obscure visibility; and pilots must be experienced at low level flying and have a knowledge of the antelope range in South Dakota.
4. Counties to be counted shall be blocked into working units not to exceed 400 square miles. The boundaries shall be delineated by roads, major stream courses, fence lines, or other identifiable topographic features.
5. The census shall consist of 33 1/3% sample based upon 1/2 mile wide belt transects spaced 1 1/2 miles on centerlines or one mile between the edges of the transects. Transect centerlines should be oriented in a north-south direction.
6. Counties with low antelope density, reported heavy winter losses, serious landowner complaints, or marginal counts will be flown 100% when economically feasible. Two 1/2 mile wide belts will be flown on each mile.
7. The census should start in areas where fence lines and roads are common. These features will assist in training the pilot and observer to estimate the 1/4 mile scanning distance and the proper spacing interval.
8. Observers are to devote full-time emphasis to this job when weather permits. Other night work is discouraged to allow for a full night's sleep which will keep fatigue at a minimum. While flying, frequent rest stops should be made. Flight periods should not exceed two hours without landing to rest and stretch.
9. Sufficient altitude should be maintained to allow observations of all terrain within the belt transect. Antelope are more observable at low altitudes.
10. All antelope within the belt transect will be classified as to sex and age if possible. The plane will never alter course to assist in identification. If there is any doubt as to the sex or age of an animal or group of animals, they will be tallied as unclassified.
11. At the end of the census, the individuals doing the field work will prepare small maps of the counties showing the work units. The number of bucks, does and unclassified antelope found in each unit will be totaled up on the antelope census summary sheet.

Appendix Table 2. Continued.

12. Determination of doe:fawn ratios will be made by random, ground counts of does and fawns observed. An attempt will be made to survey 10% of the total projected number of does in each unit during the period of July 15 to September 30.
13. In addition to antelope, all deer observed on each transect will be tallied.
14. The adjacent Conservation Officers will be advised of the survey results as soon as data compilation is completed.

For Analyzing The Data:

Antelope numbers will be tabulated for both unit and county populations. This data allows the Department to project the total population of antelope in the state to within 10% of the actual population. Current projected populations will be compared with populations in previous years. Survey data provides information on the adult breeding population and doe/fawn ratio. The doe/fawn ratio shows the annual reproductive success. This particular method has been used since 1941 and has proven adequate in obtaining the information needed to meet the job objectives.

Appendix Table 3. Antelope population by unit census, 2003.

Unit	Bucks	Does	Fawns	Doe:fawn	July Population
102A	27	129	65	100:50 ⁸	221
102B	39	165	111	100:67	315
102C	36	276	257	100:93	569
111 A ^A	70	110	110	100:100 ^B	290
115A	171	645	580	100:90 ^B	1,396
115B	741	2,247	2,022	100:90 ^B	5,010
120A	177	402	322	100:80	901
121A	84	372	312	100:84	768
124A	33	111	81	100:73	225
127A	267	585	421	100:72	1,273
127B	279	621	466	100:75	1,366
131A ^A	80	280	140	100:50	500
135A	1,017	1,863	2,385	100:128	5,265
135B	1,455	1,536	1,981	100:129	4,972
136A	45	54	30	100:55 ⁸	129
139A ^A	85	290	194	100:67	569
141A	102	315	249	100:79	666
145A	75	250	225	100:90	550
145B	36	63	57	100:90	156
149A	534	1,158	1,031	100:89	2,723
149B	207	735	838	100:114	1,780
150A	60	210	84	100:40 ^B	354
153A	447	1,059	805	100:76	2,311
153B	1,158	1,662	1,379	100:83	4,199
153C	429	1,110	888	100:80	2,427
158A	72	207	147	100:71 ⁸	426
159A ^A	50	110	44	100:40 ^B	204
160A ^A	60	210	105	100:50 ⁸	375
163A ^A	20	50	20	100:40 ^B	90
164A	117	339	302	100:89	758
Total	7,973	17,164	15,651	100:85	40,788

^A July population was estimated.

^B Doe:fawn ratio was estimated.

^C Does not include units where estimates were used.

Appendix Table 4. Firearm antelope hunter harvest projections by unit, 2003.

Unit/Type	Resident Licenses		Nonresident Licenses		Response Rate	Success	Harvest Projections		
	Available	Sold	Available	Sold			Bucks	Does	Total
102A-20	20	20	2	2	95%	73%	16	0	16
202A-20	Landowner	1			0%	0%	0	0	0
102B-20	20	21	2	2	100%	77%	14	3	17
202B-20	Landowner	1			100%	0%	0	0	0
102C-20	80	81	6	6	92%	75%	48	16	65
202C-20	Landowner	2			100%	100%	2	0	2
11 IA-20	10	10	1	1	100%	55%	6	0	6
115A-20	80	80	6	6	95%	73%	52	12	64
215A-20	Landowner	4			100%	50%	2	0	2
115A-24	150	150	12	12	93%	69%	81	31	112
	Second Tag					31%	12	38	50
215A-24	Landowner	4			25%	100%	4	0	4
115B-20	250	250	20	19	96%	64%	149	24	173
215B-20	Landowner	3			100%	67%	2	0	2
115B-22	200	204	16	12	87%	65%	17	123	140
115B-24	300	302	24	24	92%	76%	219	30	249
	Second Tag					55%	32	147	179
215B-24	Landowner	2			100%	50%	1	0	1
	Second Tag					50%	0	1	1
120A-20	40	40	3	3	94%	70%	29	1	30
220A-20	Landowner	6			100%	67%	4	0	4
121A-20	50	50	4	4	90%	72%	34	5	39
221A-20	Landowner	2			100%	100%	1	1	2
124A-20	20	20	2	2	95%	73%	15	1	16
127A-20	150	153	12	12	97%	81%	113	20	133
227A-20	Landowner	1			100%	100%	1	0	1
127B-20	150	152	12	12	89%	75%	111	12	123
227B-20	Landowner	2			100%	100%	2	0	2
131A-20	20	20	2	2	91%	91%	20	0	20
231A-20	Landowner	12			75%*	42%	5	0	5
135A-20	200	203	20	20	95%	82%	173	9	182
235A-20	Landowner	1			100%	0%	0	0	0
135A-24	250	252	24	24	91%	89%	225	22	247
	Second Tag					65%	18	161	179
235A-24	Landowner	1			100%	100%	1	0	1
	Second Tag					100%	0	1	1
135A-25	100	100	8	8	86%	71%	8	69	77
	Second Tag					50%	10	44	54
135B-20	200	201	20	19	92%	75%	151	13	164
235B-20	Landowner	7			86%	57%	4	0	

Appendix Table 4. Continued.

	Resident Licenses		Nonresident Licenses		Response Rate	Success	Harvest Projections		
	Available	Sold	Available	Sold			Bucks	Does	Total
135B-24	300	302	24	24	88%	83%	246	25	271
	Second Tag					61%	37	163	200
235B-24	Landowner	4			100%	75%	3	0	3
						25%	0	1	1
135B-25	100	100	8	8	95%	87%	18	76	94
	Second Tag					70%	16	60	76
136A-20	125	133	10	2	86%	60%	42	39	81
139A-20	10	10	1	1	100%	73%	8	0	8
239A-20	Landowner	8			75%*	75%	5	1	6
141A-20	50	53	4	1	92%	72%	30	9	39
241A-20	Landowner	3			67%*	100%	3	0	3
145A-20	50	50	4	4	86%	61%	28	5	33
245A-20	Landowner	3			100%	67%	2	0	2
145B-20	20	22	2	2	92%	58%	12	2	14
245B-20	Landowner	5			80%*	80%	4	0	4
149A-20	200	201	16	16	92%	72%	144	13	157
249A-20	Landowner	17			82%*	35%	6	0	6
149A-24	200	200	16	16	84%*	87%	158	29	187
	Second Tag					58%	26	100	126
249A-24	Landowner	6			67%*	117%	7	0	7
	Second Tag					50%	3	0	3
149B-20	150	151	12	11	90%	64%	73	30	103
249B-20	Landowner	2			100%	50%	1	0	1
149B-24	200	200	16	16	91%	69%	115	33	148
	Second Tag					44%	24	71	95
249B-24	Landowner	1			100%	100%	1	0	1
	Second Tag					0%	0	0	0
150A-20	60	61	5	4	88%	52%	23	11	34
250B-20	Landowner	5			100%	40%	1	1	2
153A-20	100	100	8	8	96%	77%	78	5	83
253A-20	Landowner	8			88%	75%	6	0	6
153A-24	200	200	16	16	95%	79%	140	31	171
	Second Tag					51%	23	88	111
253A-24	Landowner	3			33%*	100%	3	0	3
	Second Tag					100%	0	3	3
153A-25	150	129	12	13	89%	75%	13	94	107
	Second Tag					55%	16	62	78
153B-20	100	99	8	8	88%	86%	85	7	92
253B-20	Landowner	3			33%*	100%	3	0	3

Appendix Table 4. Continued.

Unit/Type	Resident Licenses		Nonresident Licenses		Response Rate	Success	Harvest Projections		
	Available	Sold	Available	Sold			Bucks	Does	Total
153B-24	250	252	20	20	94%	91%	214	34	248
	Second Tag					67%	38	143	181
153B-25	250	111	20	21	90%	82%	28	80	108
	Second Tag					65%	17	69	86
153C-20	100	97	8	8	90%	78%	78	4	82
253C-20	Landowner	2			0%*	0%	0	0	0
153C-24	150	150	12	12	95%	85%	122	16	138
	Second Tag					66%	23	84	107
153C-25	250	44	20	8	92%	65%	2	32	34
	Second Tag					60%	7	24	31
158A-20	20	23	2	0	96%	83%	16	3	19
258A-20	Landowner	3			33%*	0%	0	0	0
159A-20	20	21	2	1	91%	73%	15	1	16
160A-20	20	22	2	0	71%*	59%	12	1	13
260A-20	Landowner	1			100%	100%	1	0	1
163A-20	20	22	2	0	86%	86%	17	2	19
263A-20	Landowner	1			100%	100%	1	0	1
163A-22	10	11	1	0	90%	55%	0	6	6
164A-20	90	91	7	6	89%	78%	72	4	76
164A-24	30	30	2	2	91%	72%	22	1	23
	Second Tag					41%	1	12	13
Totals	5,535	5,340	458	419	91%	70%	3,671	2,277	5,948
Total Tags	8,415	7,862	692	643					

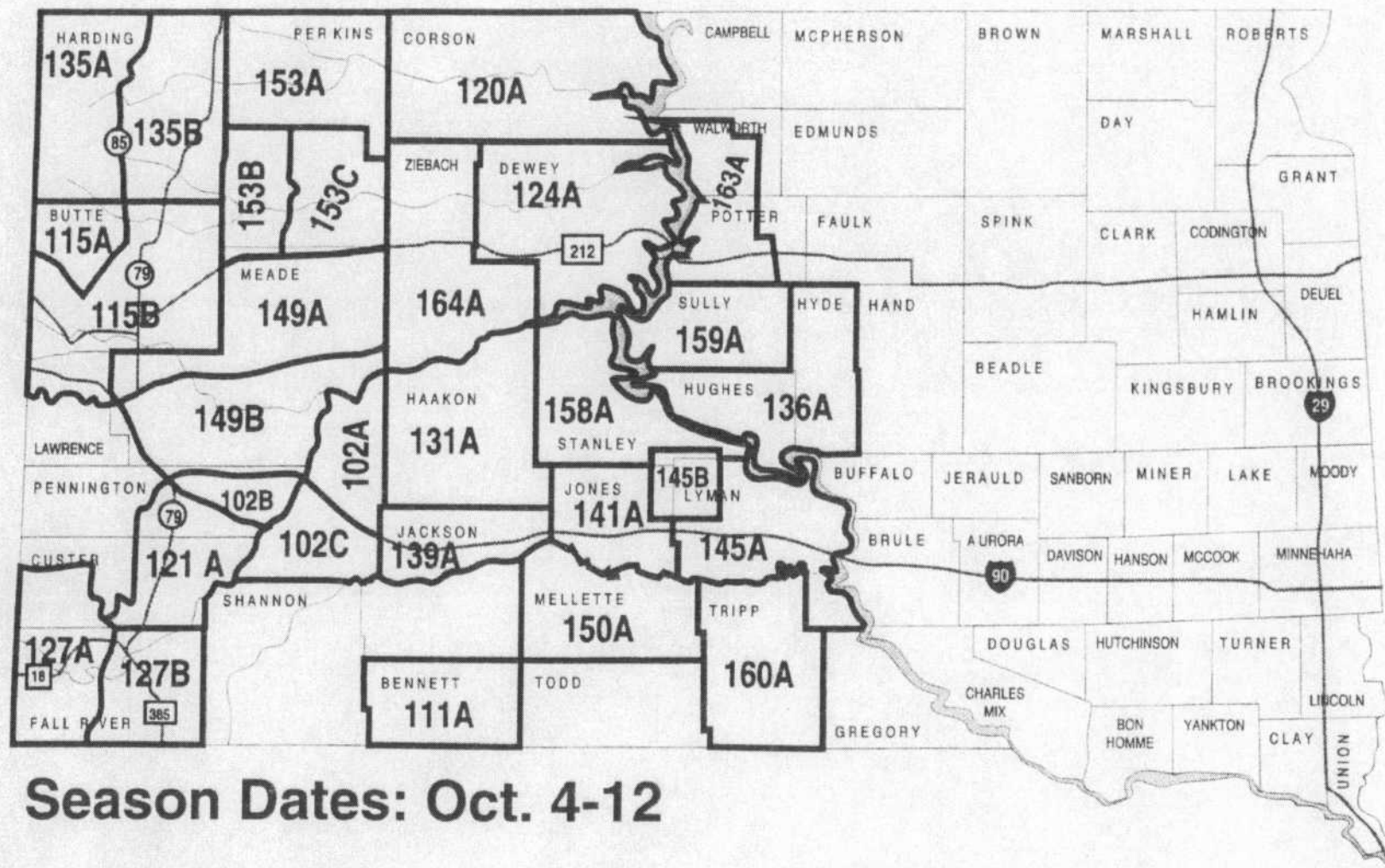
* These units showed less than 85% response so harvest projections may not be within (+/-) 15% of sample statistic

Appendix Table 5. Firearm antelope hunter questionnaire survey summary, 2003.

Total licensed hunters	5,340 Residents 419 Nonresidents 5,759 Total
Total number of tags issued	7,862 Resident 643 Nonresident 8,505 Total
Survey sample size	3,314
Proportion of all hunters surveyed	58%
Overall survey response rate	91%
Average days hunted	2.04
Projected number of days hunted	11,748
Projected total bucks harvested	3,617
Adult bucks	3,139
Kid bucks	478
Projected total doe harvest	2,277
Adult does	1,922
Kid does	355
Projected total harvest	5,948
Projected overall success	70%

Appendix Table 6. Summary of archery antelope hunter report card data, 2003.

Main Antelope Unit 700A-20:		
Total License Sales	842	Residents
	212	Nonresidents
	1,054	Total
Survey Response Rate	86%	
Average Days Hunted	5.13	Residents
	3.97	Nonresidents
Projected Total Number of Days Hunted	4,319	Residents
	842	Nonresidents
Projected Total Bucks Harvested	235	
Projected Total Does Harvested	23	
Projected Total Harvest	258	
Projected Hunter Success	24%	
Black Hills Antelope Unit 702B-20:		
Total Licensed Hunters	10	
Survey Response Rate	100%	
Average Days Hunted	3.38	
Projected Total Number of Days Hunted	34	
Projected Total Buck Harvest	3	
Projected Total Doe Harvest	0	
Projected Total Harvest	3	
Projected Hunter Success	30%	
Brule and Buffalo County Antelope Unit 714B-20:		
Total Licensed Hunters	14	
Survey Response Rate	71%	
Average Days Hunted	3.30	
Projected Total Number of Days Hunted	46	
Projected Total Buck Harvest	1	
Projected Total Doe Harvest	0	
Projected Total Harvest	1	
Projected Hunter Success	0%	



Appendix Figure 1. Firearm antelope units, 2003.